Claims

[c1] A method of current sensing in an electronic trip unit, said method comprising:
sensing an electrical current and generating an analog input signal having a first amplitude portion and a second amplitude portion that is different than the first amplitude portion;
compressing the analog input signal non-linearly by amplifying the first amplitude portion of the analog input signal greater than the second amplitude portion of the analog input signal; and
generating a trip signal when any portion of the analog input signal is greater than a pre-determined limit.

[c2] The method of Claim 1 wherein compressing the analog input signal further comprises converting the analog input signal into a digital input signal.

[c3] The method of Claim 2 wherein converting the analog signal further comprises using a mu-law transfer function.

[c4] The method of Claim 2 wherein converting the analog signal further comprises using an A-law transfer function.

[c5] The method of Claim 1 wherein generating a trip signal further comprises:
configuring a microprocessor to be responsive to the digital input signal;
decompressing the digital signal; and
comparing the digital input signal to said stored limit.

[c6] The method of Claim 1 further comprising communicating signals external to the trip unit to a microprocessor for remotely modifying said stored limit value using a digital communications port.

[c7] The method of Claim 1 further comprising detecting an electrical power frequency and generating a signal based on the frequency of electrical power monitored by said electronic trip unit.

[c8] An electronic trip unit comprising:
a sensor for sensing an electrical current and generating an analog input signal having a first amplitude portion and a second amplitude portion that is different

than the first amplitude portion;

a compressor circuit electrically coupled to said sensor for amplifying the first amplitude portion of the analog input signal greater than the second portion of the analog input signal; and

a microprocessor responsive to the digital signal, said microprocessor comprising a memory for storing program signals defining an executable program code for decompressing the digital signal, said microprocessor for generating a trip signal when the digital signal is greater than a pre-determined value.

[c9] The electronic trip unit of Claim 8 wherein said electrical current is a current flowing proximate said sensor to a load.

[c10] The electronic trip unit of Claim 8 wherein the analog input signal is proportional to the amplitude of said sensed electrical current.

[c11] The electronic trip unit of Claim 8 wherein said compressor circuit is a non-linear amplifier circuit.

[c12] The electronic trip unit of Claim 11 wherein said compressor circuit further comprises an analog to digital converter circuit for digitizing the analog input signal into a digital signal using a mu-law transfer function.

[c13] The electronic trip unit of Claim 11 wherein said compressor circuit further comprises an analog to digital converter circuit for digitizing the analog input signal into a digital signal using an A-law transfer function.

[c14] The electronic trip unit of Claim 8 further comprising a communication port for communicating signals external to said trip unit to said microprocessor for remotely modifying a plurality of limit values stored in said memory.

[c15] The electronic trip unit of Claim 8 further comprising a frequency detection circuit electrically coupled to said sensor, said frequency detection circuit generating a signal based on the frequency of electrical power monitored by said electronic trip unit.

[c16] An electrical apparatus for connecting a load to an electrical power source, said

apparatus comprising:

separable contacts selectively connecting the load to the power source when closed and disconnecting the load from the power source when open;

a sensor for sensing an electrical current and generating an analog input signal having a first amplitude portion and a second amplitude portion that is different than the first amplitude portion, a compressor circuit electrically coupled to said sensor for amplifying the first amplitude portion of the analog input signal greater than the second portion of the analog input signal, and a microprocessor responsive to a digital input signal, and comprising a memory for storing program signals for decompressing said digital signal and generating a trip signal when said digital signal is greater than a pre-determined limit value.

[c17] The electrical apparatus of Claim 16 wherein said electrical current is a current flowing proximate said sensor to a load.

[c18] The electrical apparatus of Claim 16 wherein said analog input signal is proportional to the amplitude of said sensed electrical current.

[c19] The electrical apparatus of Claim 16 wherein said compressor circuit is a non-linear amplifier circuit.

[c20] The electrical apparatus of Claim 19 wherein said compressor circuit further comprises an analog to digital converter circuit for digitizing the analog input signal into a digital signal a mu-law transfer function.

[c21] The electrical apparatus of Claim 19 wherein said compressor circuit further comprises an analog to digital converter circuit for digitizing the analog input signal into a digital signal an A-law transfer function.

[c22] The electrical apparatus of Claim 16 further comprising a communication port for communicating signals external to said trip unit to said microprocessor for remotely altering said executable program code and a plurality of limit values stored in said memory.

[c23] The electrical apparatus of Claim 16 further comprising a frequency detection

circuit electrically coupled to said sensor, said frequency detection circuit generating a signal based on the frequency of the power source monitored by the electronic trip unit.

[c24] A digital program code product for an electronic trip unit for decompressing a compressed digital input signal to restore the linearity of said signal comprising:
a code segment that receives the compressed digital input signal;
a code segment that stores the signal into a register;
a code segment that informs an executable program of the signal"s arrival in said register; and
a code segment that operates on the signal using an algorithm that decompresses the signal and restores the signal linearity.

[c25] The digital program code product of Claim 24 further comprising a code segment that receives a signal based on the frequency of the power monitored by the electronic trip unit.

[c26] The digital program code product of Claim 24 further comprising a code segment that receives a first user selectable input signal, directing said algorithm to use a mu-law decompression technique, and receives a second user selectable input signal, directing said algorithm to use an A-law decompression technique.